

## Node 4.5.2

# Recreational Fisher Modelling

- Recreational fishers
  - Driven by complex multiple objectives – consumption and experience where experience includes catch, species, size, time, sport, social and environmental interaction
  - To develop better management we need to be able to “predict” how recreational fishers respond to various management initiatives and in particular
  - How they respond to improved biomass and catch share allocations
- Contrast with Commercial Fishers where:
  - Single objective modelling of effort based on profit allows for high predictability and transferability because objective function is same across fisheries and jurisdictions

# Modelling To Date

- Consistent with economic theory, models developed are based on the individual fisher as a utility maximising consumer who makes choices based on maximizing their individual welfare subject to a budget constraint.
- The key choice variables for a recreational fisher are;
  - days fished per year
  - fishing time and non fishing time per trip
  - retained and released catch
  - size of fish kept
- And of particular interest is the way fisher behaviour is influenced by biomass
  - Abundance will influence the catchability of the fish for the fisher and will therefore impact upon the time (and cost) to catch fish
  - Catch rate and/or size is the reflection of abundance for the fisher

# Scenarios Being Considered

- How does fishing effort (time) respond to bag and size limits?
- How does fishing effort (time) respond to improved stock abundance?
- How does catch (keep and release) and the size kept respond to bag and size limits?
- How do annual days fished respond to bag and size limits and improved stock abundance?
- What role does price (cost) play in supporting bag and size limits, closures, etc?

# Model Results Based on Early Surveys

-ve Binomial Regression of Trips per Annum Against Determining Variables

Parameter	estimate	s.e.	t	t pr.
Constant	2.343	0.195	12.01	<.001
Dhufish, Pink Snapper and Baldchin Groper	0.0790	0.0365	2.16	
Catch Rate				0.031
Other species catch rate	0.0088	0.0263	0.34	0.737
Travel Time to Boat Ramp/Start Point	-0.0985	0.0814	-1.21	0.226
Pertripcost (bait, food etc) + petrol costs	-0.00780	0.00298	-2.61	0.009
Equip cost annual	0.0000519	0.0000857	0.60	0.545
High Income (1=yes)	0.628	0.216	2.90	0.004

Catch rates have a +ve impact on # of trips per annum

Travel time and trip costs have a -ve impact

Elasticities	Coefft	Mean	Elasticity =Coefft*Mean	Marginal Effects=coefft*mean
DSGfishrate	0.079	1.8	0.1422	0.942944
Otherfishrate	0.0088	3	0.0264	0.1050368
Fishrate	0.025	4.8	0.12	0.2984
Travel time	-0.0985	1.4	-0.1379	-1.175696
Per trip costs	-0.0078	28	-0.2184	-0.0931008
Tradeoff				
Marginal effect DSG	0.079	11.93	0.94247	
Marginal Effect Other	0.0088	11.93	0.104984	8.98

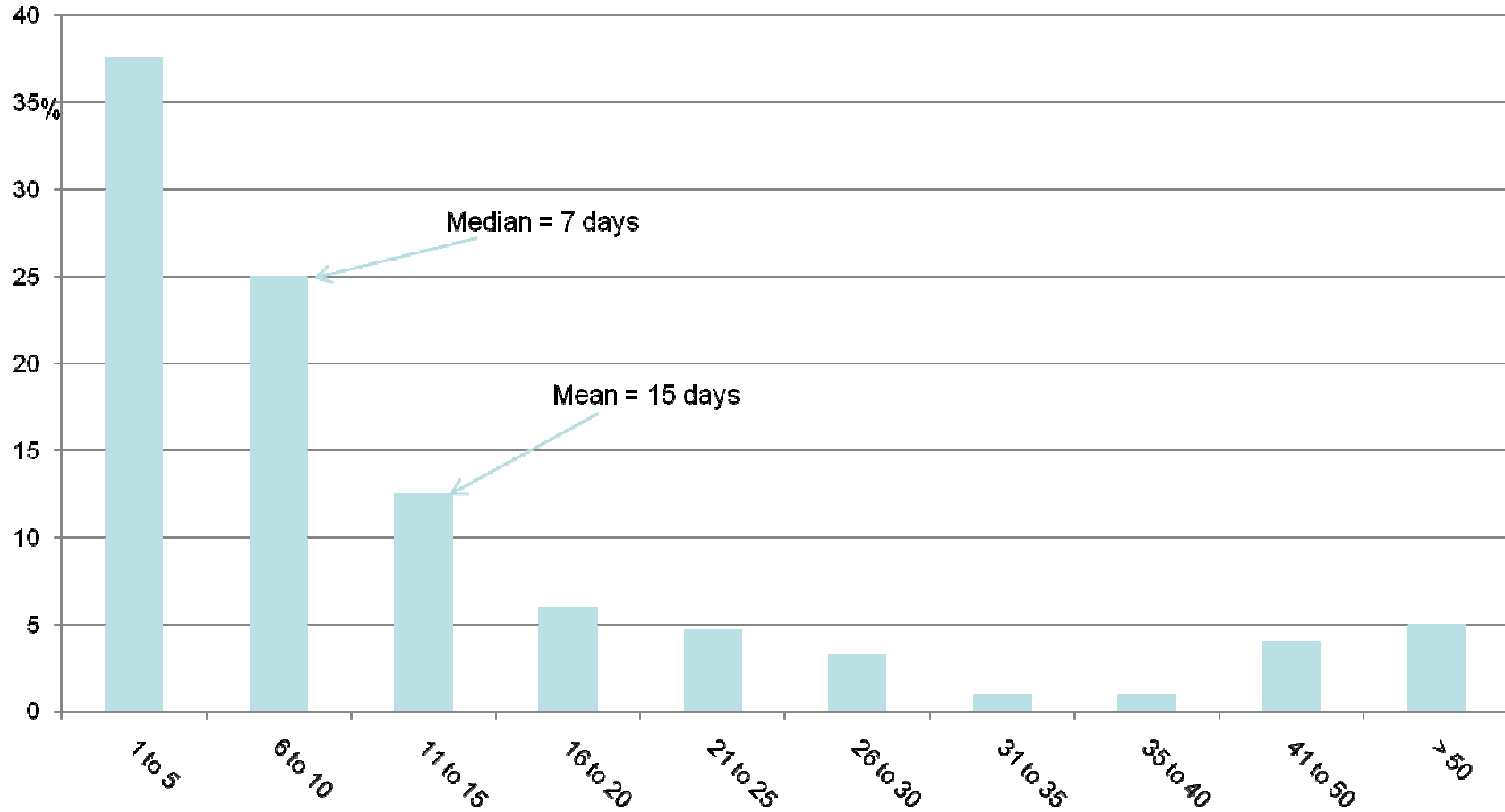
Elasticity of trips to catch rate < 1 for DSG and Other Species and .12 for overall catch rate.

Ratio of marginal effect on # trips allows inference re value. A catch of DSG = 9 times other species.

## Recfisher respondents by regional zone, June 2009 & June 2010

	DoF	DoF/ UWA/ MU	
<b>West Coast Bioregion</b>	<b>2008/09</b>	<b>2009/10</b>	<b>% more/less</b>
Kalbarri	?	37	
Mid-west	?	86	
Metro-north	140	260	86
Metro-south	143	241	69
Metro-east of airport	142	22	-85
Regional South West	100	125	25
<b>Subtotal</b>	<b>525</b>	<b>771</b>	<b>47</b>
<b>Outside West Coast</b>			
Regional northern	92	26	
Regional Goldfields/eastern	91	1	
<b>Subtotal</b>	<b>183</b>	<b>27</b>	
<b>Total</b>	<b>708</b>	<b>798</b>	

# Distribution of number of days fished by recreational fishers in 2008/09 in WA



# Opportunities for changes in fisher behaviour

- Substitute target species or location or activity – Gone off fishing
- Population and income growth
- Value of time



# Next Steps

- Surveys based on TRF in 2010-11 - next season
- Analysis of behaviour across three surveys
- Some key questions
- How does fishing effort (time) respond to bag and size limits.
  - How does fishing effort (time) respond to improved stock abundance?
  - How does catch (keep and release) and the size kept respond to bag and size limits ?
  - How do annual days fished respond to bag and size limits and improved stock abundance?
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# Next Steps

- Analysis of behaviour across three surveys
- Some Other Key Questions
- What future monitoring ?
  - What is a good combination and frequency of survey tools – fisheries dependent and fisheries independent